Introduction to high throughput screening - 2 ECTS

The course gives a broad introduction to high throughput screening (HTS) that is technique used to identify biologically active small organic molecules through screening of compound libraries with the help of robust test systems and advanced instrumentations.

Participants can start at any time and study in their own paces since the course is entirely web-based. The course material is in English consisting of text and explanatory figures, video lectures, review articles, and movies.

Responsible department: Department of Chemistry

Level: Advanced

Content

The course includes a description of small organic molecules as research tools and starting points for drug development. In addition different parameters to consider when designing a compound collection for HTS will be reviewed. Biological activity is most cases that the organic molecule affect a protein or other biomolecule. The course describes development of robust and statistically validated test systems that allow biological activity to be measured by e.g. luminescence, absorbance, or fluorescence. The most common instruments for liquid handling and reading of the test system signal will be reviewed. The course also covers how HTS is performed and how molecules that are identified as potentially actives are followed up by analysis of analogs and additional test systems. HTS generates large amounts of data and the course briefly reviews the important role that an informatics system has. The course also covers a number of special topics and case studies to illustrate the application of HTS.

Expected study results

After completion of the course students shall be able to

- account for the different components and steps that are included in HTS
- describe properties of importance for an organic molecules intended for use as a research tool and/or starting point for drug development
- explain physical-chemical properties of importance when selecting a compound collection intended for HTS
- describe the requirements for a assay to be used in HTS
- describe the most common assay types and how they are applied in HTS
- explain the most common techniques and types of instrumentation for liquid handling and reading output signals from different types of assays
- describe how HTS is performed and how potentially active molecules are validated
- show a basic understanding of informatics from a HTS perspective, and
- suggest a relevant assay and HTS protocol for a given target e.g. an enzyme.

Prerequisites: Bachelor degree (120 ECTS) in chemistry, molecular biology, pharmacology or equivalent. English knowledge corresponding to the Swedish upper secondary education English B.

Course format: The course is entirely web-based with English course material consisting of text, figures, video lectures, review articles, research articles, and movies. The students study at their own places and examination will be carried out on request.

Examination: The course examination is carried out by taking a web-based test that will be offered on request**.** The test is in the format of e.g. multiple-choice questions. The course will be graded with either Pass or Fail upon test completion.

Registration: Please send an E-mail to stina.lindberg@umu.se if you want to register for the course.

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